[Proc. Roy. Soc. Victoria, 48 (N.S.), Pt. I., 1935.]

Art. I.—*Geological Notes on Lake Connewarre, near Geelong.*

By ALAN COULSON, M.Sc.

[Read 10th May, 1934; issued separately, 2nd December, 1935.]

Introduction.

Lake Connewarre lies about 5 miles from the mouth of the Barwon River, in a tract of marshy land about 16 square miles in area. The locality is shown in the inset map A, which also shows the drainage basins of the Leigh, Moorabool, and Barwon rivers. The details of the lake are shown on the accompanying map, and from this it will be noted that, in addition to Lake Connewarre proper, there are numerous small lagoons and two larger bodies of water, Reedy Lake and Lake Murtnagurt. Reedy Lake contains fresh water, but all the others are brackish because tidal salt water reaches as far as the Lower Breakwater.

Two geological explanations suggest themselves for the origin of the lake; first, that local subsidence has occurred; secondly, that the basins were developed behind flows of basalt which entered the sea. The latter hypothesis was advanced by the author in 1933 (1), and further field work appears to confirm this view.

Evidence has been obtained from bores put down in the area by the State Rivers and Water Supply Commission. The Geelong Harbour Trust, Geelong Waterworks and Sewerage Trust, Cheetham Salt Company, Barwon Heads Golf Club, and the Mines Department, supplemented by numerous shallow bores put down by the author. For this field work, a grant from the University of Melbourne was obtained, enabling the author to purchase a hand-drill made in five lengths of 10 feet each, and fitted with an auger head. Two men could sink this with ease through silt or loose sand, but sandy clay and tenacious marine clay could not be penetrated, nor could solid rocks, such as basalt. The tool served a useful purpose in locating basalt where it was covered by several feet of sediment, and in this way the geological features were mapped. The locations of all the bores are illustrated on the map, and the details of each are appended to this paper.

The author appreciates the generosity of the authorities mentioned in supplying information and assistance, and also the help rendered by Mr. E. R. Churches, of Campbell's Point, Lake Connewarre, and several friends who assisted with the boring.

Geology.

Geological Quarter Sheet 29 N.W., prepared by Daintree in 1861, includes the Moolap and Connewarre parishes, and shows the outline of the lake as it appeared then. Reference to the author's map shows that there has been considerable siltation, the width having been reduced by 10 chains on the southern side. There has also been a reduction in depth, and the present depth of water in the middle of the lake is 4 feet, where formerly it was 7 feet. New mud flats and sand bars have appeared, and others are forming.

The geology of the portion now reclaimed, but shown as water on the Quarter Sheet, has been mapped by the author, using the boring tool to probe through the mud, and so ascertain the nature of the bottom. Fossils obtained at Fisherman's Point and Bald Hill enable the rocks there to be classed as Kalimnan (Lower Pliocene), whereas the Survey regarded them as "probably Miocene."

The order of succession of the geological formations is:—

Recent silt, sand, sandy clay, shell beds.
Pleistocene to Recent dune sandstone, travertine.
Newer Basalt.
Lower Pliocene sands, ironstone.
Lower Miocene marine clay.

Lower Miocene Clay.

A fossiliferous yellow clay, containing Lower Miocene fossils (2), outcrops a few feet above water level along the high northern and eastern banks of Lake Connewarre from Campbell's Point to Ocean Grove. The clay forms the bed of the lake, and slopes gradually to the south, being met with at 35 feet depth on Campbell's Flat in bores No. 59 and 60. It is not met at this depth in the Reedy Lake, as bores 6 and 7 passed through 51 feet and 63 feet respectively of Recent silt at the Lower Breakwater. This indicates that either (*a*) erosion of the Tertiary rocks, or (*b*) local subsidence, has taken place along the tract of low-lying land running from Reedy Lake to the Salt Works on Stingaree Bay (see inset map B), the eastern portion of Corio Bay. There is a relatively high bank on each side of this trough; on the west side it consists of the Newer Basalt of Geelong, and on the east side there is the Leopold-Fisherman's Point hill capped by Lower Pliocene sands strongly resembling a fault escarpment. Probably the valley is due to local down-warping or trough-faulting of a narrow strip of land, about 3 miles wide and 6 miles long.

This feature is of importance, because it increases the complexity of the post-Miocene shoreline. Instead of a simple semicircular bay between Ocean Grove and Torquay, the inlet at that time was shaped like a funnel, with a channel connecting the sea with Stingaree Bay. One cannot be certain at what point the ancient Barwon entered this channel; possibly it did not do so until after the volcanic activity of Upper Pliocene or Lower Pleistocene times.

Regarding the Lower Miocene clays and limestones which extend from Belmont and Waurn Ponds to Torquay, recent excavations and the bores for the Geelong Sewer Outfall have revealed these rocks further east than the outcrops shown on the Quarter Sheet 28 N.E., often with only a thin capping of soil. Thus in section 1, allotments 15, 22, and 29, Parish of Connewarre, limestone and marl were encountered at depths down to 20 feet; in J. Armstrong's pre-emptive right, Parish of Puebla, where Armstrong's Creek crosses the Torquay-Geelong road, there is a marl-pit in Lower Miocene rock; and in allotment 24c, Parish of Puebla, about half a mile east of the Torquay road there is a marl-pit on Thompson's Creek, south bank, in which such forms as *Glycimeris gunyoungensis* Chap. & Sing., *Septifer fenestratus* Tate, *Cucullea corioensis* McCoy, *Turritella murrayana* Tate, and *Scaphander tenuis* Harris can be found.

Thus it appears that the Miocene rocks are continuous underground throughout the area, and at a slight depth, except in the valley running north from Reedy Lake, where there was local erosion or subsidence. No general subsidence has occurred in the area since the post-Lower Pliocene uplift, and this fact is of importance in considering the origin of the lake basins.

Lower Pliocene Sands, Ironstone.

The Lower Pliocene rocks, which consist essentially of sand and grit partly cemented by iron oxides, immediately overlie the Lower Miocene clays, and practically surround the northern side of Lake Connewarre, attaining a thickness of 80 to 100 feet. They are barren of fossils except at Fisherman's Point, where, on the eastern projection near water level, the author located a band of calcareous grit which yielded shells indentified by Miss Irene Crespin, B.A., as follow:—*Chlamys antiaustralis*, *C. sturtiana*, *Liopyrga quadricingulata*, *Nucula obliqua*, and *Ostrea* sp., the assemblage having a Kalimnan (Lower Pliocene) aspect.

The comparative absence of fossils in this formation may be due to the coarse nature of the sediments, which are of shallow water origin, and to subsequent leaching. False bedding and irregular induration are characteristic.

Newer Basalt.

Mount Duneed, a hill 340 feet high, situated about 5 miles west of the lake, was the centre of extrusion of the olivine andesine basalt, which flowed towards the east and south.

In the scoria pits on the summit of Mount Duneed, one can see embedded in the scoria numerous ejected blocks of limestone containing Lower Miocene fossils, and occasional masses of ferruginous sandstone, identical with those of Lower Pliocene age in the Connewarre district. The volcanic activity took place, on this evidence, in post-Lower Pliocene times. Along the coast from Barwon Heads to Bream Creek, the basalt is overlain by bedded dune sandstones of Pleistocene to sub-Recent age. The basalt may therefore be of any age from Upper Pliocene to sub-Recent.

A broad sheet of basalt extends eastwards from Mount Duneed to Lake Connewarre, where it divides into several tongues, as shown on the map (Fig. 1). The westerly tongue stretches from Tait's Point to Fisherman's Point, and has been breached by the Barwon to a depth of 35 feet below lake level. Another tongue, about 150 yards wide, extends from near Bald Hill, across the lake mouth at Sheoak Point, to the Pelican Rocks on the other side, a distance of 3 miles. At the lake mouth it is 15 feet below the surface of the water. The third and larger tongue extends eastwards along the southern coast to the Bluff at Barwon Heads, but is obscured in places by the overlying dune sandstone. At low tide it can be seen on the beach at the Bluff, at Black Rocks Sewer Outfall, and at a point half way between. The Ant Spit and Charlemont Reef, just off the coast between the Bluff and Black Rocks, possibly represent portions of this flow. Near the Sheepwash, on the south bank of the channel between Lake Connewarre and Barwon Heads, there is basalt at 10 feet depth and about 100 yards wide (Bore No. 124). This does not appear to stretch across the channel, and is probably a northerly extension of the basalt of the Bluff. Probably basalt underlies all the higher land around Barwon Heads, and its eroded surface is covered with the dune sands and travertine of Pleistocene to Recent age.

No evidence is available as to what kind of rock underlies the basalt. Bore No. 138, near Bald Hill, passed through 64 feet of basalt without bottoming. Probably in the Connewarre area, as elsewhere in the Geelong district, the basalt rests on Lower Pliocene sands, which in turn overlie Lower Miocene marine rocks. In places, however, particularly under the tongues, it is probable that the Lower Pliocene is absent owing to erosion.

Pleistocene to Recent Dune Sandstone, Travertine.

Remnants of the older bedded dune sandstones can be seen at intervals along the coast from Black Rocks eastward, but they are best exposed at the Bluff, where the seaward face rises abruptly to a height of 128 feet. This craggy headland shows three distinct angles of stratification, with dips to the north at various angles up to 40 deg. Between the beds of sandstone are several horizontal bands of a peculiar conglomerate, consisting of fragments of sandstone of black, grey, brown, and cream colours. The bands are only a few inches thick, but under each is several feet of travertine. Griffiths (3) stated that pebbles of basalt occur in the conglomerates, but the author has been unable to confirm this, despite prolonged search, and concludes that pebbles of black sandstone were erroneously regarded as basalt. Examination showed that all the pebbles in the conglomerate are of sandstone, the variation of colour being due to the different percentages of carbonaceous matter present.

It is suggested that the conglomerates were formed by the breaking up of the surface soil beds at different stages in the growth of the large dune. Atmospheric agents could easily accomplish this, and it is not therefore necessary to invoke marine action to explain the origin of the Bluff and the formation of its conglomerates.

At the base of the Bluff, the lowest bed of sandy clay includes many pebbles of the underlying basalt. In dune sandstone at Queenscliff (4) there were found *Arctocephalus williamsi* McCoy and *Phascolomys pliocenus* McCoy, and at Sorrento (5) *Palorchestes azael,* forms considered to be Pleistocene in age. If the bedded dunes of Barwon Heads are comparable in age with these, they may be regarded as Pleistocene, but the unbedded dunes are of later date, probably sub-Recent.

A crust of travertine forms a few inches under the surface wherever the dune sands occur, and is particularly noticeable throughout the high land between Barwon Heads and the Great Salt Swamp, where it forms an impervious capping for the sub-artesian water.

The Ocean Grove sand spit has grown in a windward direction for about 2 miles towards the protecting Bluff, and constitutes a bay-mouth bar in the estuary of the Barwon.

Recent Silt, Sand, Sandy Clay, Shell Beds.

In addition to the Recent mollusca previously listed (1), the borings yielded certain foraminifera and bryozoa, which Messrs. W. J. Parr and L. W. Stach respectively kindly identified as follow:—

Foraminifera.—*Gyroidina glabrata* Cush., *Bolivinella folium* P. & J., *Rotalia beccarii* Linné, *Quinqueloculina costata* d'Orb., *Discorbis margaritifera* H. A. & E., *D. disparalis*, *D. australensis* H. A. & E., *D. australis* Parr, *D. dimitiatus* J. & P., *D. opercularis* d'Orb., *D. patelliformis* Brady, *Elphidium macellum*, F. & M., *E. crispum* Linné, *E. advenum* Cush., *Trifarina bradyi* Cush., *Globigerina bulloides* d'Orb., *Planulina biconcava* J. & P.

Bryozoa.—*Cornuticella cornuta* Busk, *Scuticella margaritacea* Busk, *Pterocella alata* W. Th., *Menipea crystallina* Gray, *Crisia acropora* Busk, *C. tenuis* MacG., *Vittaticella perforata* Busk, *V. elegans* Busk, *V. hannafordi* MacG., *V. umbonata* Busk.

All the above forms range from Pleistocene to Recent in age. and are marine in habitat, some exclusively so. This indicates that during siltation, salt water had access to the lake basins.

An estimate by the author of the total Recent sediment in the lake basins and marshes gives the volume as 9,500,000,000 cubic feet, and the weight as 250,000,000 tons. Practically all the inorganic material was transported by the Barwon River, and aquatic vegetation has become embedded in the silt deposited in the quieter portions of the lake. Along the river channel through the lake, fine sand is deposited, and this is also abundant near the lake mouth. Shell beds 3 or 4 feet in thickness occur in the Great Salt Swamp and on the northern bank of Reedy Lake, and are invariably underlain by yellow sandy clay.

The filling of the valley running between Reedy Lake and Stingaree Bay was not simply due to fluviatile deposition, as the highest part of its bed is at present 11 feet above water level. Probably beach ridges were formed by the wave action, in the manner Jutson (6) has described at Point Henry, and by a combination of the two processes, the valley was reclaimed from the sea. Marine shells and sandy clay are found in excavations along the valley.

Origin of the Lake.

Shortly after the uplift which closed the Lower Pliocene period, the coast between Torquay and Ocean Grove showed a large funnel-shaped bay, narrowing to a wide channel at its head running north to Corio Bay. The bay was shallow, and its bed was composed mainly of Lower Miocene clay, with some patches of Lower and possibly Upper Pliocene sediment.

Then in Upper Pliocene or Pleistocene times, the volcano of Mount Duneed became active, and extruded lava eastwards in a broad flood into the shallow bay. As the lava advanced into the water it divided into three tongues, which took different directions, the westerly travelling along the Tait's Point-Fisherman's Point ridge, the central one going north-east to the vicinity of the Pelican Rocks, and the larger southern flow travelling from Black Rocks to the Bluff. No faulting within the area covered by these flows occurred after their extrusion, as is evidenced by the fact that the slope of the basalt surface is very gradual and uniform towards the lake.

Lagoons were formed behind these lava barriers, and the waters of the Barwon were dammed back for some time. The site of the Reedy Lake marshes was probably a large freshwater lake, but the lagoons occupying the basins of Lake Connewarre and the Great Salt Swamp were partly open to the sea because the basalt did not quite reach the eastern shore.

After a time, the Barwon cut through the basalt tongue between Tait's Point and Fisherman's Point to enter Lake Connewarre, leaving Bald Hill a hill of circumdenudation as a result of its trying several courses. Then the lava barrier at the Sheoak Point-Pelican Rocks tongue was cut through, and the river continued through the Great Salt Swamp basin to the sea between the Bluff and Ocean Grove, probably nearer to the latter than at present.

Siltation of the lake basins began immediately, being greatly assisted by the narrowness of the outlets, and also by flooding of the river At the same time, sand dunes began to pile up on the southern tongue along the coast from Torquay to Barwon Heads, and have continued to accumulate and rearrange themselves to the present day. At intervals, subaerial denudation resulted in the formation of thin beds of conglomerate at the Bluff. The seaward face of the dune at the Bluff has suffered considerable denudation by marine erosion.

The channel to the north of Reedy Lake was blocked by beach ridges at the Stingaree Bay end (Fig. 1B), and the whole of the basin became slowly silted by alluvium from the Barwon.

Salt water was never long absent from any of the basins formed by the basalt flows, therefore the fossil fauna is typically marine.

References.

1. Coulson, A. A Study of Lake Connewarre. *Vic. Nat.*, l., 1933. 1.

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Appendix.

Logs of Bores.

Bore No.	Depth.	Authority.	Particulars.
	ft.		
1	18	A.C. ..	Recent silt and sand 10′, shell 1′, clay 7′
2	15	A.C. ..	Recent silt and sand 10′, shell 1′, clay 4′
3	18	A.C. ..	Recent silt and sandy clay 18′
4	15	A.C. ..	Recent silt 12′, sandy clay 3′
5	6	A.C. ..	Recent silt 5′, sandy clay 1′
6	51	G.H.T. ..	Recent sand and silt 39′, shelly sand and clay 6′, sandy clay 6′
7	63	G.H.T. ..	Recent sand and silt 53′, shell and sand 10′
8	8	S.R.W.C. ..	Recent sand and shell
9–14	14	S.R.W.C. ..	Recent sand and shell
15	12	S.R.W.C. ..	Recent sand and shell
16	8	S.R.W.C. ..	Recent sand and shell
17	14	S.R.W.C. ..	Recent sand and shell
18	10	S.R.W.C. ..	Recent sand and shell
19–22	14	S.R.W.C. ..	Recent sand and shell
23	14	S.R.W.C. ..	Recent silt
24	7	S.R.W.C. ..	Recent drift sand
25	12	S.R.W.C. ..	Recent sandy clay
26–31	14	S.R.W.C. ..	Recent silt
32, 33	12	S.R.W.C. ..	Recent silt
34, 35	14	S.R.W.C. ..	Recent silt
36	12	S.R.W.C. ..	Recent sand and shell
37	8	S.R.W.C. ..	Recent drift sand
38	6	S.R.W.C. ..	Recent drift sand
39	13	A.C. ..	Recent silt 12′, sandy clay 1′
40	12	A.C. ..	Recent silt, 10′, sand 2′
41	3	A.C. ..	Recent silt 3′, basalt bottom
42	33	A.C. ..	Water 2′, recent silt 31′, basalt bottom
43	25	G.H.T. ..	Water 3′, recent silt 22′
44	12	G.H.T. ..	Water 2′, recent silt 10′, basalt bottom
45	35	A.C. ..	Water 4′, recent silt 31′, basalt bottom
46	19	A.C. ..	Water 2′, recent silt 17′, basalt bottom
47	17	A.C. ..	Water 1′, recent silt 16′
48	18	A.C. ..	Water 2′, recent silt 16′
49	17	A.C. ..	Water 1′, recent silt 16′
50	15	A.C. ..	Water 2′, recent silt 13′
51	17	A.C. ..	Recent silt 16′, sandy clay 1′
52	15	A.C. ..	Recent silt 14′, sandy clay 1′
53	12	A.C. ..	Recent silt 11′, sandy clay 1′
54	6	A.C. ..	Recent silt 5′, sandy clay 1′
55	13	A.C. ..	Recent silt 13′
56	20	A.C. ..	Recent silt
57	27	A.C. ..	Recent silt
58	28	A.C. ..	Recent silt
59–60	35	A.C. ..	Recent sand 34′, Miocene clay 1′
61	11	A.C. ..	Water 2′, recent silt 9′
62	4	A.C. ..	Water 2′, Miocene clay 2′
63	15	A.C. ..	Water 1′, recent silt 14′
64	18	A.C. ..	Water 1′, recent silt 17′
65	22	A.C. ..	Water 2′, recent silt 20′
66	13	A.C. ..	Water 1′, recent silt 12′, Miocene clay bottom
67–68	21	A.C. ..	Water 1′, recent silt 20′
69	20	A.C. ..	Recent silt 20′
70	5	A.C. ..	Recent silt 4′, sandy clay 1′

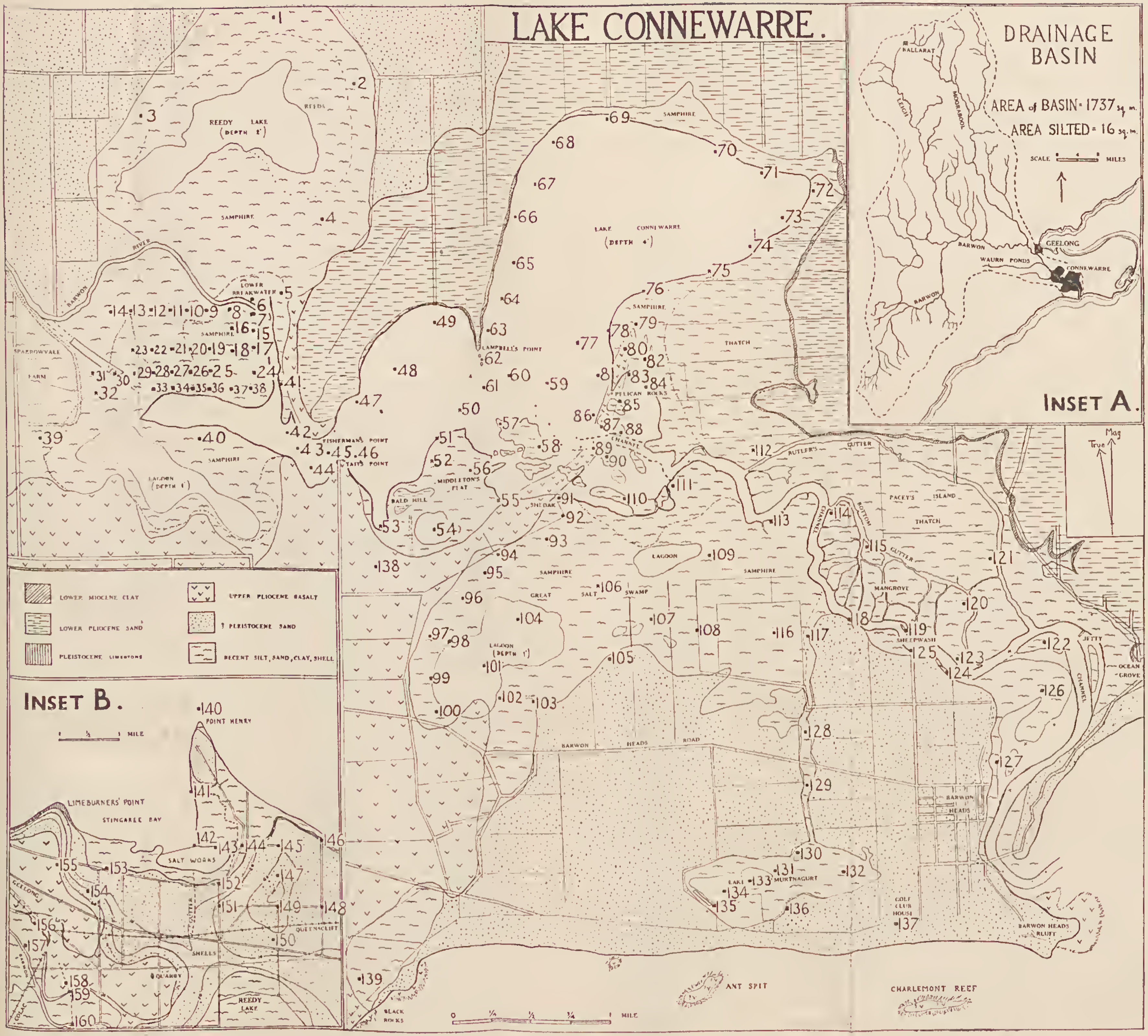
LOGS OF BORES—*continued.*

Bore No.	Depth.	Authority.	Particulars.
	ft.		
71	19	A.C. ..	Water 1′, recent silt 18′
72	30	A.C. ..	Recent silt and sand 29′, Miocene clay 1′
73	20	A.C. ..	Recent silt and sand
74	25	A.C. ..	Recent silt and sand
75	20	A.C. ..	Recent silt and sand
76	44	A.C. ..	Recent sand
77	19	A.C. ..	Water 2′, recent silt 17′
78	40	A.C. ..	Recent sand
79	10	A.C. ..	Recent silt and sand 10′, basalt bottom
80	2	A.C. ..	Recent silt 2′, basalt bottom
81	18	A.C. ..	Recent silt
82	15	A.C. ..	Recent silt and sand
83	26	A.C. ..	Recent silt and sand
84	36	A.C. ..	Recent silt and sand
85	23	A.C. ..	Recent silt
86	15	A.C. ..	Recent sand
87	14	A.C. ..	Recent silt 14′, basalt bottom
88	24	A.C. ..	Recent silt and sand
89	10	A.C. ..	Recent sand 10′, basalt bottom
90	23	A.C. ..	Recent silt and sand
91	5	A.C. ..	Recent silt, shell and and 5′, basalt bottom
92–3	10	A.C. ..	Recent silt, shell, sandy clay
94	11	A.C. ..	Recent silt, shell, sandy clay
95	9	A.C. ..	Recent silt, shell, sandy cay
96	7	A.C. ..	Recent silt, shell, sandy clay
97	4	A.C. ..	Recent silt 4′, basalt bottom
98	7	A.C. ..	Recent silt 2′, shell 1′, sandy clay 4′
99	7	A.C. ..	Recent silt, shell, sandy clay
100	6	A.C. ..	Recent silt
101	9	A.C. ..	Recent silt, shell, sandy clay
102	8	A.C. ..	Recent silt, shell, sandy clay
103	10	A.C. ..	Recent silt, shell, sandy clay
104	8	A.C. ..	Recent silt
105	12	Well ..	Pleistocene dune sands
106–7	10	A.C. ..	Recent silt 4′, shell 2′, sandy clay 4′
108	7	A.C. ..	Recent silt 3′, shell 2′, sandy clay 2′
109	9	A.C. ..	Recent silt, shell, silt
110	16	A.C. ..	Recent silt 10′, sandy clay 6′
111	17	A.C. ..	Recent silt 10′, sandy clay 7′
112	14	A.C. ..	Recent silt
113	15	A.C. ..	Recent silt
114	14	A.C. ..	Recent silt
115	17	A.C. ..	Recent silt, sandy clay
116	6	A.C. ..	Recent silt 5′, sandy clay 1′
117	5	A.C. ..	Recent silt
118	10	A.C. ..	Recent silt 9′, sandy clay 1′
119	17	A.C. ..	Recent silt
120	15	A.C. ..	Recent silt
121	14	A.C. ..	Recent silt
122	12	A.C. ..	Recent sand
123	17	A.C. ..	Recent silt
124	10	A.C. ..	Recent silt, basalt bottom
125	15	A.C. ..	Recent silt
126	12	A.C. ..	Recent silt
127	10	A.C. ..	Recent silt
128	5	A.C. ..	Recent silt 4′, sandy clay 1′

LOGS OF BORES—*continued.*

Bore No.	Depth.	Authority.	Particulars.
	ft.		
129	6	A.C. ..	Recent silt 5′, sandy clay 1′
130	8	A.C. ..	Recent silt 2′, shell 1′, sandy clay 1′
131	5	A.C. ..	Water 1′, recent silt 2′, shell 1′, sandy clay 1′
132	6	A.C. ..	Water 1′, recent silt 2′, shell 1′, sandy clay 2′
133	7	A.C. ..	Water 1′, recent silt 2′, shell 2′, sandy clay 2′
134	6	A.C. ..	Water 1′, recent silt 2′, shell 2′, sandy clay 1′
135	10	A.C. ..	Recent silt 9′, sandy clay 1′
136	6	A.H.G.C. ..	Pleistocene to recent dune sands
137	65	B.H.G.C. ..	Pleistocene to recent dune sands
138	64	Private ..	Basalt throughout
139	3	A.C. ..	Recent clay, basalt bottom
140	6	A.C. ..	Recent sand, shell
141	10	A.C. ..	Recent black silty clay
142	3	A.C. ..	Recent black silty clay
143	5	A.C. ..	Recent sand
144	15	G.W.S.T. ..	Recent sand 3′, sandy clay 12′
145	14	G.W.S.T. ..	Pleist.—Recent clay
146–7	15	G.W.S.T. ..	Pleist.—Recent clay
148	14	G.W.S.T. ..	Pleist.—Recent sandy clay
149	15	G.W.S.T. ..	Pleist.—Recent sandy clay
150	339	Mines Dept.	Soil 2′, clay, blue and yellow, stiff 23′, clay, sandy 4′, sand, fine 3′, gravel, coarse 11′, clay, sandy 3′, clay, yellow 3′, clay, sandy 3′, clay, fossiliferous, blue 287′
151	15	G.W.S.T. ..	Pleist.—Recent sandy clay
152	13	G.W.S.T. ..	Pleist.—Recent sandy clay
153	92	C.S.Co. ..	Marl with rubbly limestone 30′, limestone, hard 32′, rubble 5′, limestone, hard 6′, hard stone (? basalt) 7′, fine clay and sand 7′, blue clay with fossils 5′
154	10	G.W.S.T. ..	Pleistocene to recent clay
155	15	G.W.S.T. ..	Basaltic clay
156	20	G.W.S.T. ..	Basaltic clay, 20′, basalt bottom
157	25	G.W.S.T. ..	Recent clay, gravel
158	27	G.W.S.T. ..	Recent sand and clay, basalt bottom
159	24	G.W.S.T. ..	Recent sand and silt, basalt bottom
160	28	G.W.S.T. ..	Recent clay and silt

S.R.W.C. .. State Rivers and Water Supply Commission.
G.H.T. .. Geelong Harbour Trust.
B.H.G.C. .. Barwon Heads Golf Club
G.W.S.T. .. Geelong Waterworks and Sewerage Trust.
C.S.Co. .. Cheetham Salt Coy., Bore 2, 1918.
Mines Dept. .. Moolap, No. 1 Bore, 1927.
A.C. .. Alan Coulson.


LAKE CONNEWARRE.
DRAINAGE BASIN
AREA of BASIN - 1737 sq. m.
AREA SILTED = 16 sq. m.
BALLARAT
LEIGH
MOORABOOL
BARWON
GEELONG
WAURN PONDS
CONNEWARRE
INSET A.
INSET B.
POINT HENRY
LIMEBURNERS' POINT
STINGAREE BAY
SALT WORKS
QUEENSCLIFF
SHELLS
QUARRY
REEDY LAKE
REEDY LAKE (DEPTH 2')
LAKE CONNEWARRE (DEPTH 4')
SAMPHIRE
THATCH
REEDS
BARWON RIVER
LOWER BREAKWATER
SPARROWVALE
FARM
LAGOON (DEPTH 1')
CAMPBELL'S POINT
PELICAN ROCKS
FISHERMAN'S POINT
TAIT'S POINT
MIDDLETON'S FLAT
BALD HILL
SHEOAK
CHANNEL
BUTLER'S GUTTER
PACEY'S ISLAND
BOTTOM GUTTER
MANGROVE
SHEEPWASH
GREAT SALT SWAMP
LAGOON
BARWON HEADS ROAD
BARWON HEADS
JETTY
OCEAN GROVE
LAKE MURTNAGURT
GOLF CLUB HOUSE
BARWON HEADS BLUFF
ANT SPIT
CHARLEMONT REEF
BLACK ROCKS
LOWER MIOCENE CLAY
LOWER PLIOCENE SAND
PLEISTOCENE LIMESTONE
UPPER PLIOCENE BASALT
? PLEISTOCENE SAND
RECENT SILT, SAND, CLAY, SHELL
True
Mag